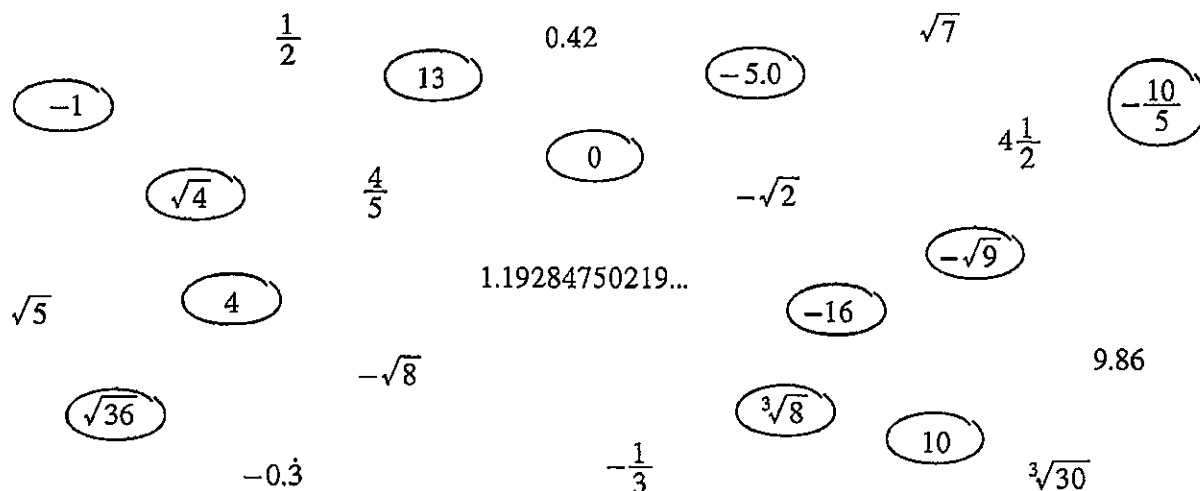


Page 2 questions

Types of Numbers



Irrational numbers can't be written as a fraction

 $-\sqrt{2}$ $\sqrt{7}$ $\sqrt[3]{30}$ $-\sqrt{8}$ $\sqrt{5}$ $1.19284750219\dots$

Rational numbers can be written as a fraction

 $\frac{1}{2}$ 9.86 $4\frac{1}{2}$ $-\frac{1}{3}$ $-0.\dot{3}$ 0.42 $\frac{4}{5}$

Integers: the positive and negative whole rational numbers including 0.

 -1 -16 -5.0 $-\sqrt{9}$ $-\frac{10}{5}$ 0

Natural numbers: the counting rational numbers (not including 0).

 4 13 $\sqrt{36}$ 10 $\sqrt[3]{8}$ $\sqrt{4}$

Page 9 questions

Ascending and descending order

1 Circle the word that represents the order of the values in these statements:

- | | | | |
|---|----------------------|-----------|------------|
| a | Shortest to Tallest | Ascending | Descending |
| b | Longest to shortest | Ascending | Descending |
| c | Closest to farthest | Ascending | Descending |
| d | Warmest to Coolest | Ascending | Descending |
| e | Heaviest to lightest | Ascending | Descending |
| f | Thinnest to widest | Ascending | Descending |

2 Arrange the following groups of numbers into **ascending** order (lowest to highest).

- a 0 , 3 , 14 , 17
- b 19 , 20 , 21 , 22 , 25
- c -16 , -12 , -10 , -8 , -4
- d -2.6 , -2 , 0 , 2.2 , 2.4
- e -1.5 , -1 , $\frac{1}{5}$, $\frac{1}{4}$, 1 , 11

3 Arrange the following groups of numbers into **descending** order (highest to lowest).

- a 16 , 8 , 5 , 2
- b 40 , 38 , 32 , 31 , 29
- c -11 , -13 , -16 , -18 , -19
- d 1.9 , 1.6 , 1.2 , -1.0 , -1.2
- e 1.2 , 0 , $-\frac{1}{4}$, -2.1 , $-2\frac{1}{2}$, -30

Page 10 questions

Ascending and descending order

Combo Time!

- 4 a Start = 3 floor

Floor and associated directed movement

- ☐ 12th floor = +9 floors
- ☐ 8th floor = -4 floors
- ☐ Ground floor = -8 floors
- ☐ 2nd floor = +2 floors
- ☐ Ground floor = -2 floors
- ☐ 15th floor = +15 floors
- ☐ 4th floor = -11 floors
- ☐ 10th floor = +6 floors
- ☐ 5th floor = -5 floors

+9, -4, -8, +2, -2, +15, -11, +6, -5

- b +15, +9, +6, +2, -2, -4, -5, -7, -11

- c Total ascending = $15 + 9 + 6 + 2 = 32$ floors up (+ 32)

Total descending = $2 + 4 + 5 + 8 + 11 =$ floors down (- 30)

∴ the operator mostly ascended in the first 15 minutes as the total floors travelled ascending are 2 more than the total floors travelled descending.

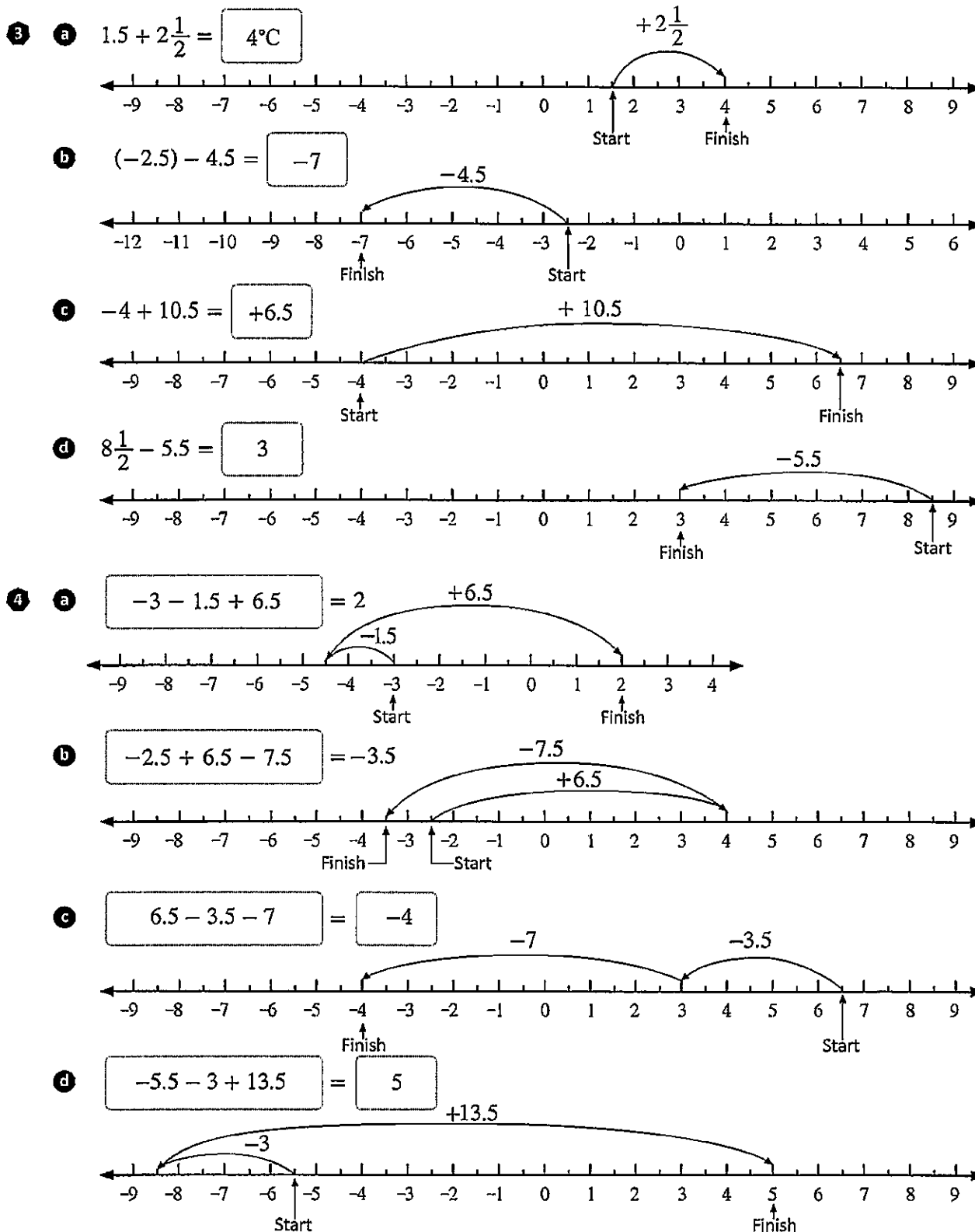
Another simple way to work this out is comparing the starting floor level with the finishing floor level.

Started on 3rd floor
Finished on 5th floor

∴ finished 2 floors above where started, so more floors travelled ascending.

Page 16 questions

Addition and subtraction using a number line



Page 22 questions

Adding and subtracting directed numbers

Calculate these additions and subtractions of integers without a calculator.

- 1 a $-5 + 3 = -2$ b $-4 + 7 = 3$ c $-4 - 4 = -8$
- d $-11 - 8 = -19$ e $1 - 16 = -15$ f $16 - 22 = -6$
- g $6 + (-3) = 3$ h $30 + (-17) = 13$ i $0 + (-8) = -8$
- j $-4 + (-5) = -9$ k $-10 + (-19) = -29$ l $13 - (-5) = 18$
- m $20 - (-21) = 41$ n $-18 - (-6) = -12$ o $-15 - (-26) = 11$

- 2 a $4 - 8 + 2 = -2$ b $-9 + 6 - 8 = -11$
- c $-3 + 4 - 8 - 7 = -14$ d $-7 + (-4) + 13 = 2$
- e $2 - (-6) - 7 = 1$ f $5 + (-1) - (-14) = 18$

Page 23 questions

Adding and subtracting directed numbers

- 3 a $5.5 - 8 = -2.5$ b $-3 + 2.5 = -0.5$ c $-2 - 7.5 = -9.5$
- d $-6\frac{1}{2} - 19 = -25.5$ e $9.5 - 16 = -6.5$ f $7.5 + (-18) = -10.5$
- g $0.5 + (-5.5) = -5$ h $-12\frac{1}{2} - (-3\frac{1}{2}) = -9$ i $0 - (+8) - (-6) = -2$

Page 23 questions

Adding and subtracting directed numbers

4 a $-2 - 7 + 3.5 = -5.5$

b $1 + 0.5 - 6 = -4.5$

c $2 + (-3.5) + 1.5 = 0$

d $-7\frac{1}{2} + (-9) - (-2\frac{1}{2}) = -14$

e $-8.5 - (-6\frac{1}{2}) + 18 = 16$

f $-4 + (-4) - (-4\frac{1}{4}) - 4\frac{1}{4} = -8$

Page 24 questions

Adding and subtracting directed numbers

5 a $53 - 89 = -36$

b $-43 + 94 = 51$

c $34 + (-51) = -17$

d $-25 + (-94) = -119$

e $-94 - (-28) = -66$

f $-16 + (-87) - (-41) = -62$

g $-2.6 + 10.4 = 7.8$

h $-0.5 - 6.7 = -7.2$

i $-10.3 + (-5.6) = -15.9$

j $66 - 34.6 + (-24.4) = 7$

k $1.06 + 4.5 - 9.7 = -4.14$

l $-0.23 + 1.76 = 1.53$

m $(-71.23) + (-52.38) = -123.61$

n $-1.204 - (-5.093) = 3.889$

o $98.23 - (-13.8) - 112.3 = -0.27$

p $-29\frac{1}{3} + 51 = 21\frac{2}{3}$

q $-30\frac{1}{3} - (-66\frac{1}{2}) = 36\frac{1}{6}$

r $100 + (-54\frac{1}{2}) - 46\frac{1}{4} = -\frac{3}{4}$

Page 31 questions

Order of operations

$$\begin{aligned} 1 \quad a \quad (16 - 10) \times 4 &= 6 \times 4 \\ &= 24 \end{aligned}$$

$$\begin{aligned} b \quad 34 \div (6 + (-8)) &= 34 \div (-2) \\ &= -17 \end{aligned}$$

$$\begin{aligned} c \quad -5 \times (27 \div 9) &= -5 \times 3 \\ &= -15 \end{aligned}$$

$$\begin{aligned} d \quad (-13 - (-19)) \times 3 &= 6 \times 3 \\ &= 18 \end{aligned}$$

$$\begin{aligned} e \quad -5 \times (14 - 9) - 5 &= -5 \times 5 - 5 \\ &= -25 - 5 \\ &= -30 \end{aligned}$$

$$\begin{aligned} f \quad 4 \times (36 \div 2) - (-4) &= 4 \times 18 + 4 \\ &= 72 + 4 \\ &= 76 \end{aligned}$$

$$\begin{aligned} g \quad 18 + (16 \div 4 + 10) &= 18 + (4 + 10) \\ &= 18 + 14 \\ &= 32 \end{aligned}$$

$$\begin{aligned} h \quad (18 \div 2 - (-4)) - 7 &= (9 - (-4)) - 7 \\ &= 13 - 7 \\ &= 6 \end{aligned}$$

$$\begin{aligned} 2 \quad a \quad (-2)^2 \div (-2) &= 4 \div (-2) \\ &= -2 \end{aligned}$$

$$\begin{aligned} b \quad (-7 - 5) \times (-1)^3 &= -12 \times (-1) \\ &= 12 \end{aligned}$$

$$\begin{aligned} c \quad (8 - 14)^2 - 16 &= (-6)^2 - 16 \\ &= 36 - 16 \\ &= 20 \end{aligned}$$

$$\begin{aligned} d \quad (3^3 - 43) \div 8 &= (27 - 43) \div 8 \\ &= -16 \div 8 \\ &= -2 \end{aligned}$$

Page 32 questions

Order of operations

$$\begin{aligned} 3 \quad a \quad 26 \div (14 + 2 \times 6) + (-1)^2 &= 26 \div (14 + 12) + (-1)^2 \\ &= 26 \div 26 + 1 \\ &= 1 + 1 \\ &= 2 \end{aligned}$$

$$\begin{aligned} b \quad -100 \times (12 - 32 \div (-4)) \div 40 &= -100 \times (12 - (-8)) \div 40 \\ &= -100 \times 20 \div 40 \\ &= -2000 \div 40 \\ &= -50 \end{aligned}$$

Page 32 questions

Order of operations

$$\begin{aligned}
 \text{3 c } (11 \times 2^3 - 10) \div 39 + 8 &= (11 \times 8 - 10) \div 39 + 8 \\
 &= (88 - 10) \div 39 + 8 \\
 &= 78 \div 39 + 8 \\
 &= 2 + 8 \\
 &= 10
 \end{aligned}$$

$$\begin{aligned}
 \text{d } 9 \times ((-8) - 8 \div 4 + 16) - 4^3 &= 9 \times ((-8) - 2 + 16) - 4^3 \\
 &= 9 \times (-10 + 16) - 4^3 \\
 &= 9 \times 6 - 4^3 \\
 &= 9 \times 6 - 64 \\
 &= 54 - 64 \\
 &= -10
 \end{aligned}$$

$$\begin{aligned}
 \text{e } 200 \div (-4) \times (-3) \div (16 - 14 \times (-1)^3) &= 200 \div (-4) \times (-3) \div (16 - 14 \times (-1)) \\
 &= 200 \div (-4) \times (-3) \div (16 + 14) \\
 &= 200 \div (-4) \times (-3) \div 30 \\
 &= -50 \times (-3) \div 30 \\
 &= 150 \div 30 \\
 &= 5
 \end{aligned}$$

Page 34 questions

Order of operations with grouping symbols

$$\begin{aligned}
 \text{1 a } (16 + 9) + (14 - 7) &= 25 + 7 \\
 &= 32
 \end{aligned}$$

$$\begin{aligned}
 \text{b } (1 - 9) - (3 - 8) &= -8 - (-5) \\
 &= -8 + 5 \\
 &= -3
 \end{aligned}$$

$$\begin{aligned}
 \text{c } (7 - 11) \times (4 + 2) &= -4 \times 6 \\
 &= -24
 \end{aligned}$$

$$\begin{aligned}
 \text{d } (18 - 3) \div (-12 - (-7)) &= 15 \div (-12 + 7) \\
 &= 15 \div (-5) \\
 &= -3
 \end{aligned}$$

$$\begin{aligned}
 \text{e } \frac{46 - 19}{5 - 2} &= (46 - 19) \div (5 - 2) \\
 &= 27 \div 3 \\
 &= 9
 \end{aligned}$$

$$\begin{aligned}
 \text{f } \frac{-2 \times 10}{48 \div 12} &= (-2 \times 10) \div (48 \div 12) \\
 &= -20 \div 4 \\
 &= -5
 \end{aligned}$$